

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2003-313778
(43)Date of publication of application : 06.11.2003

(51)Int.Cl. D06M 15/233
A61K 9/70
A61K 47/32
A61K 47/34
A61K 47/48
A61P 11/06
A61P 17/00
A61P 27/16
A61P 37/08

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(54) NONWOVEN FABRIC FOR REDUCING ALLERGEN

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a nonwoven fabric for reducing allergens, treated as automatically reducing attached allergens, e.g. an animal allergen such as acarids, a plant allergen such as pollen.

SOLUTION: This nonwoven fabric for reducing the allergens is provided by fixing an allergen-reducing component such as an aromatic hydroxy compound by printing with an ink containing the same on at least one side of the nonwoven fabric, or by bonding the allergen-reducing substance to the side chain of a linear polymer.

LEGAL STATUS

[Date of request for examination] 27.09.2004

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

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JP 2003-313778 A [CLAIMS]

1/2 ページ

2/2 ページ

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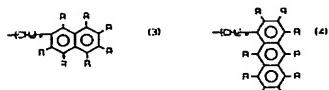
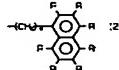
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CLAIMS

[Claim(s)]

- [Claim 1] At least one side of a nonwoven fabric — allergen reduction — the allergen reduction-ized nonwoven fabric characterized by the ink containing a degassed part being fixed by printing.
 [Claim 2] The allergen reduction-ized nonwoven fabric according to claim 1 with which an allergen reduction-ized component is characterized by being an aromatic series hydroxy compound.
 [Claim 3] The allergen reduction-ized nonwoven fabric according to claim 2 characterized by the above-mentioned aromatic series hydroxy compound being a compound which at least one functional group shown in the side chain of a linear macromolecule at following general formula (1) — (6) combined.
 [Formula 1]



- (R shows hydrogen or a hydroxyl group among a formula, and n shows the integer of 0, or 1—5)
 [Claim 4] The allergen reduction-ized nonwoven fabric according to claim 2 characterized by the

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above-mentioned aromatic series hydroxy compound being a polymerization or a compound obtained by copolymerizing about the monomer which has the phenolic group of the monomer and/or monovinylene which have at least one functional group shown by above-mentioned general formula (1) — (6).
 [Claim 5] The allergen reduction-ized nonwoven fabric according to claim 2 with which the above-mentioned aromatic series hydroxy compound is characterized by being an aromatic heterocycle type hydroxy compound.
 [Claim 6] An allergen reduction-ized nonwoven fabric given in any 1 term of claims 1—6 characterized by the allergen reduction-ized component and the hydroscopic component being mixed by ink.
 [Claim 7] An allergen reduction-ized nonwoven fabric given in any 1 term of claims 1—6 characterized by being that to which allergen originates in Deni.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the allergen reduction-ized nonwoven fabric which gave the function which reduction-izes allergen, such as Dari and pollen, to the nonwoven fabric.

[0002]

[Description of the Prior Art] In recent years, many allergies, such as atopic dermatitis, bronchial asthma, and allergic rhinitis, are posing a problem. The main cause is for the allergen (Der1, Der2) of inside nature Acaei of a dengue and many Chile Dari especially in house dust and much allergen, such as cedar pollen allergen (Cry1 and Cry2) which mainly rages in spring, to increase in a life space.

[0003] Even if especially Chile Dari's allergen exterminates Chile Dari who becomes the cause, the dead insect will supply the allergenic high matter to a life space further, and it does not result in fundamental solution of the allergies from which allergen becomes a cause. Therefore, in order to prevent the decudescence or the new sensitization of the allergies, allergen is completely removed from a life space, or it is needed to denature allergen and to make it inactive.

[0004] Although it is thought that conversion of it is carried out by heat, strong acid/strong base, etc., and it loses allergen since the above allergen is protein, from the oxidizer, the reducing agent, the heat, the alkali, or the acid of extent which it is very extremely stable and can be used for insurance at home, it is not decomposed easily (The Journal of Immunology Vol.144:1353-1360). When conversion of the allergen tended to be carried out by force by such approach, there was a trouble of the contamination location of allergen etc. being damaged according to conditions.

[0005] As the contamination location and subsistence store of allergen with which existence of the allergen in a life space poses a problem here for example, a tatami, a carpet, a floor (flooring), and furniture (a sofa and a cloth blur chair →) A table, bedding (a bed, bedding sheet), a supply (a sheet, infant sheet) in the car, a child supply, a baby supply, a curtain, wallpaper, a towel, clothing, sewing-basis, textiles, air cleaner, an air wash machine (a body and filter), a towel, etc. are mentioned.

[0006] How to carry out conversion of the molecule front face of allergen chemically on comparatively mild conditions has been considered for the above-mentioned problem, for example, tannins (tongue NINGU), such as green hide, etc. — the approach of reduction-izing allergen is indicated, using respectively hydroxybenzoic-acid (JP.6-279273,A) system compounds, such as a tannic acid (JP.2-16731), a tea extract, etc. which are used, or the salt (JP.11-292714,A) of those.

[0007] however, the location where the conventional allergen reduction-ized agent was polluted by allergen — reduction — it was difficult not only to take time and effort, but to have to process spraying a degassed part by a spray etc. and to perform uniform processing. Furthermore, troubles, such as always having a bad influence on the body, also had the location polluted by allergen until processed.

[0003]

[Problem(s) to be Solved by the Invention] This invention is to offer the allergen reduction-ized nonwoven fabric with which processing which can carry out [****]-izing of the adhering allergen automatically was performed, without performing allergen reduction-ized processing anew in view of the above-mentioned trouble.

[0009]

[Means for Solving the Problem] the allergen reduction-ized nonwoven fabric of this invention — at least one side of a nonwoven fabric — allergen reduction — it is characterized by the ink containing a degassed part being printed.

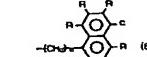
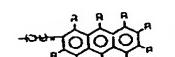
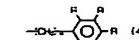
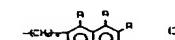
[0010] Hereafter, this invention is explained to a detail, the allergen reduction used by this invention — a degassed part is a component which inactivates allergen and can control an antigen antibody reaction, this invention — this allergen reduction — in order to print a degassed part on a hydrophobic nonwoven fabric front face, it is used, mixing ink. Since the ink to be used is also hydrophobicity, the component which dissolves in a solvent like ethanol or isopropanol is desirable.

[0011] the above-mentioned allergen reduction — the allergen reduction which will be later mentioned if it takes into consideration the oral acute toxicity in the case of contacting directly the coloring nature to the mask and sheet which are a final product, and operating also in degassing, stimulating to the skin], etc. — it is desirable to use a degassed part.

[0012] As such an allergen reduction-ized component, it is desirable to use an aromatic series hydroxy compound. Especially as an aromatic series hydroxy compound, although not limited, the compound which has at least one functional group shown in the side chain of a linear macromolecule by following general formula (1) — (6) from the point that there are few worries about the coloring to a final product especially is desirable.

[0013]

[Formula 2]



[0014] The above-mentioned general formula (1) in — (6), R shows hydrogen or a hydroxyl group and n shows the integer of 0, or 1—5.

[0015] The above-mentioned general formula (1) in — (6), when n exceeds 5, the effectiveness which uses a linear macromolecule may be lost. Moreover, in general formula (1) — (6), since coloring nature may become strong even if it may fully be unable to demonstrate allergen reduction-ized effectiveness and there are too many hydroxyl groups when all R is hydrogen, it is desirable that one of R is a hydroxyl group. Furthermore, as for a hydroxyl group, it is desirable that steric hindrance has combined with fewest parts, for example, it is desirable in a general formula (1) that it is in the para position.

[0016] As the above-mentioned linear macromolecule, a vinyl polymerization object, polyester, a polyamide, etc. are used with synthetic macromolecule, for example. Moreover, especially about the chemical bond of the functional group and linear macromolecule which are shown by above-mentioned general formula (1) — (6), it is not limited but carbon-carbon bonding, an ester bond, ether linkage, amide association, etc. are mentioned.

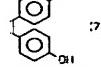
[0017] as the compound which has the functional group shown by above-mentioned general formula (1) — (6) in the side chain of a linear macromolecule — Pori 3 and 4 from safety or the ease of receiving 5-hydroxybenzoic-acid vinyl, a polyvinyl phenol, the poly thyrasin, Pori (1-vinyl-5-hydroxy naphthalene), Pori (1-vinyl-6-hydroxy naphthalene), and Pori (1-vinyl-5-hydroxy anthracene) etc. — it is used suitably.

[0018] Moreover, a polymerization or the compound obtained by copolymerizing can be used for the monomer which has the phenolic group of the monomer and/or monovalence which have at least one functional group shown in above-mentioned general formula (1) — (6) as the above-mentioned aromatic series hydroxy compound.

[0019] 1 and 2-[(4-hydroxyl) ethyl] ethene which will not be limited especially if it is the compound which the monomer which has the hydroxyl group of a piece has combined with the benzene ring more than the piece as a monomer which has the above-mentioned univalent phenolic group more than a piece, for example, is shown by the vinyl phenol, the thyrasin, and the following general formula (7) is mentioned. When a monomer has a univalent phenolic group, there is an advantage of being hard to discolor compared with a polyhydric phenol.

[0020]

[Formula 3]



[0021] As other monomers by which copolymerization is carried out to the monomer which has the above-mentioned univalent phenolic group more than a piece, ethylene, acrylic, methacrylate, methyl methacrylate, hydroxyethyl methacrylate, hydroxyethyl acrylate, hydroxypropyl acrylate, hydroxypropyl methacrylate, styrene, etc. are mentioned, for example.

[0022] Although a polymerization or especially the molecular weight of a compound obtained by copolymerizing is not limited in the above-mentioned monomer, that the monomer which has the above-mentioned univalent phenolic group carried out [that] the at least two or more piece polymerization, for example is desirable, and carries out a five or more piece polymerization more preferably.

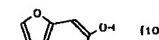
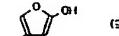
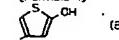
[0023] Moreover, an aromatic heterocycle type hydroxy compound can be used as the above-mentioned aromatic series hydroxy compound. Especially as the above-mentioned aromatic heterocycle type hydroxy compound, it is not limited, for example, a 2-hydroxy furan, a 2-hydroxy thiophene, hydroxy benzofuran, a 3-hydroxy pyridine, etc. are mentioned. Moreover, you may be a polymerization or the compound copolymerized and obtained about the compound which has an aromatic heterocycle type hydroxy group in the side chain of a linear

macromolecule, and the monomer which has an aromatic heterocycle type hydroxy group.

[0024] What [the hydroxy group combined with heterocycle frames, such as a thiophene shown by the following general formula (8) or (9), and a furan, as the above-mentioned aromatic heterocycle type hydroxy group, for example] What the hydroxy group combined with the frame with the heterocycle shown by the following general formula (10), and an aromatic series ring. What has a hydroxy group and an allyl group (five or less carbon number) in a heterocycle frame, the thing which has a hydroxy group and an allyl group (five or less carbon number) in a frame with heterocycle and aromatic series are mentioned.

[0025]

[Formula 4]



[0026] In order to base the above-mentioned aromatic series hydroxy compound also on the use gestalt of a nonwoven fabric as an amount blended with the allergen reduction-ized nonwoven fabric of this invention, it is not limited especially. For example, when using it as a nonwoven fabric used as the para intermedia material of bedding or a carpet which Dari inhabits, or when using it as disposable nonwoven fabric weaving team covering etc., it is usually 2 m. It is desirable above-mentioned to adjust combination so that it may be fixed about 1 mg or more of per compounds. Although effectiveness does not fall even if it fixes the amount beyond it, it is 2 1m. When beyond about 10g is fixed, cleaning after processing etc. may be needed with a deposit of a compound.

[0027] In addition — this invention — allergen reduction — it is [that at least one degassed should just be used] also possible to use it or more combining two. Moreover, as loadings in case two or more sorts of above-mentioned compounds are blended into the allergen reduction-ized nonwoven fabric of this invention, in order to be based also on a use gestalt, it is not limited especially. Considering the above-mentioned allergen reduction-ized component as a total amount, it is 2 1m of nonwoven fabrics. Since sense of incongruity may be produced to that cleaning after processing etc. is needed with a deposit of this component, and the feel of nonwoven fabric original when it fixes about [g or more] per 10, superfluous use should be avoided.

[0028] this invention — setting — the above-mentioned allergen reduction — since it cannot interact with allergen without moisture, and a degassed part makes effectiveness discover also in the condition that the humidity in air is low, it is desirable to fix a hygroscopic component to coincide. If it is the object which dissolves in ethanol or isopropanol as a hygroscopic component, it can be used, for example, polymer acids [such as polymer salt, polycrylic acid].

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5/7 ページ

JP.2003-313778.A [DETAILED DESCRIPTION]

6/7 ページ

such as polycalcohol sodium polyacrylate salts [such as polyether, polyvinyl alcohol], such as a polyethylene glycol, a polypropylene glycol, and polyoxymethylene, etc. are mentioned.
[0029] As for the above-mentioned allergen reduction-ized component and a hydroscopic component, it is desirable to dissolve or distribute to a suitable solvent and to use the active principle of the above-mentioned compound for it as a liquefied component. As the above-mentioned solvent, water, alcohols, hydrocarbons (methyl alcohol, ethyl alcohol, propyl alcohol, etc.) (benzene, a styrene, a methylnaphthalene, kerosene, cyclohexane, etc.), ether (diethylether, a tetrahydrofuran, dioxane, etc.), ketones, and amides (an acetone, methyl ethyl ketone, etc.) (N,N-dimethylformamide etc.) are mentioned, for example.

[0030] In the range which does not check the effectiveness of allergen reduction-ized effectiveness, adjuvants for pharmaceutical preparation, such as a dispersant, an emulsifier, a wetting agent, a thickener, an antioxidant, an ultraviolet ray absorbent, and a coloring agent, may be blended with the allergen reduction-ized nonwoven fabric of this invention, and miticide, the permicide, the antifungal agent, the deodorant, etc. may be blended with it.

[0031] Vegetable allergen, such as animal allergen and pollen, is mentioned as target allergen [nonwoven fabric / of this invention / allergen reduction-ized]. The allergen reduction used by this invention — a degassed part reduction-izes allergen of the used location by suppressing a reaction with the specific antibody of such allergen. As animal allergen with especially effectiveness, it is the allergen (it is the living thing of Acazi and Arthropoda 1 Arachnida-Acarina, and mainly divided into seven suborders) of Acazi. The Notostigmophora represented by reed NAGADANI and the 4 spiracles which are represented by KATADANI The Yemato tick, the posterior spiracles which are represented by TSUBAMEHIMEDANI a house dust mite, and spiracles while the meso SHIDANI representation is carried out the front spiracle represented by stag beetle pawl ticks and NAMIKORIDANI, the Tyrophagus putrescentiae, a pneumatic [which are represented by Dermatophagoides farinae]. IEASARADANI, and KAZARI — a spikin, although it can be applicable by any classes, such as Cryptostigmata represented by ticks Among house dust, on especially bedding and effectiveness is especially in the department of Chela Dani and Epidermopididae leading to the allergensis.

[0032] The substance store which serves as a hotbed of allergen in a life space as the object and location where the allergen reduction-ized agent concerning this invention is used is mentioned, as a top Norio activity article — a tatami, a carpet, and furniture (a sofa and a cloth burl chair —) A table, bedding (a bed, bedding, sheet), supply in the car (a sheet, infant seat). The use to a baby supply (baby buggy), wallpaper, clothing, sewing-basis, etc. is mentioned. express this nonwoven fabric front face to a front face respectively, and it considers as a product, and also how to use this nonwoven fabric for the interior as a bag which wraps bedding cotton etc., for example is considered.

[0033] The ready-made nonwoven fabric from which the nonwoven fabric used by this invention was made by various approaches is mentioned. Although the manufacture approach of a nonwoven fabric is various, it divides roughly, and is divided into the wet process using water, and the dry type process which does not use water, and there are still more specifically the following manufacture processes.

1) raw materials, such as wet nonwoven fabric pulp, — grinding — a beater — grinding — mixing — agitate with a lot of water, fiber, binder resin, and dispersants with a beater. Subsequently, after slushing into a paper machine and removing moisture, it puts on the felt, fiber is transferred to a dryer, and it dries.

[0034] 2) Rotate the drum version to which the needle of a music box attached the raw material with the dry type nonwoven fabric carding machine, hook small quantity every, and produce Webb (curdy sheet). It presses and dries and a nonwoven fabric is obtained, after applying a binder to this by the atomizer, immersion, etc.

2-1) By making the raw material of a low-melt point point mix in the case of the thermal bond nonwoven fabric above-mentioned dry process, dissolve a low-temperature raw material at a heat press process, and fix between fiber.

2-2) Fix a raw material by making adhesives sprinkle in the case of the chemical bond nonwoven fabric above-mentioned dry process.

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[0035] 3) Span band nonwoven fabric resin is fused, blow off from a direct spinning port as fiber, perform embossing with a hot calender roll, and make it the shape of a sheet.
4) While extruding a melt blow type nonwoven fabric polymer with high pressure, consider as the sheet of super-thin fiber by blowing away hot blast.

5) Dissolve a flash plate spinning nonwoven fabric polymer with a solvent, and carry out spinning with high pressure.

[0036] Although the above-mentioned nonwoven fabric can be used no matter it may be what material, as an application, hydrophobicity uses a high material in many cases. For example, compared with the material which uses pulp, nylon, polyethylene SUTERU, rayon, and an acrylic as a raw material, hydrophobicity becomes high, and a polypropylene 100% nonwoven fabric can be used good. In addition, in order to raise hydrophobicity, the material which performed water repellent finishing to the front face of a material on which no hydrophobicity is originally is usable. Moreover, especially the metakey amount of the nonwoven fabric used by this invention is not limited.

[0037] This invention — setting — allergen reduction — although especially the approach of fixing a degassed part is not limited, it is desirable to use various printing machines for applying to homogeneity that there is no nonuniformity in a front face. For example, the offset press usually used in case it prints to paper or a nonwoven fabric, a photogravure printing machine, a screen printer, etc. are usable. Especially, if the front face of a photogravure printing machine is even, it has the advantage whose high-speed printing becomes possible.

[0038] If the ink used by this invention does not contain moisture, it will not be emitted especially, if moisture is included in ink — allergen reduction — since the aromatic series hydroxy compound which is a degassed part causes condensation, it cannot be used. As usable ink, UV ink which UV is irradiated [ink] and stiffens it, and the solvent mold ink which is made to carry out evaporation desiccation of the solvent, end is fixed are mentioned, for example. In addition, although especially the color of ink is not limited, since there are some allergen reduction components which are presenting brown originally, when the ink of these end a light color is used, the color tone to demand may not be demonstrated.

[0039] It is desirable to perform mixing of the ink used by this invention and an allergen reduction component with the following procedures. First, the aromatic series hydroxy compound which is an allergen reduction component is dissolved using solvents, such as ethanol and isopropanol. Although the amount of an allergen reduction component changes with a component or solvents to be used, when the Poly 4-vinyl phenol (Aldrich make) of weight average molecular weight (Mw) 8000 is used for an allergen reduction component and ethyl alcohol (Wako Pure Chem make special grade chemical) is used for a solvent, respectively, it can be dissolved to the weight ratio 1:1, for example.

[0040] Next, the ethanol solution of the above-mentioned aromatic series hydroxy compound is added in ink. The blending ratio of coal in the ethanol solution of the aromatic series hydroxy compound at this time has I desirable % of the weight or more, and it is 30 ~ 95% of the weight of the range more preferably. If the concentration of an aromatic series hydroxy compound becomes low, allergen reduction-ized effectiveness may not fully be demonstrated. On the contrary, if the concentration of an aromatic series hydroxy compound becomes high too much and the amount of ink decreases, after printing on a nonwoven fabric front face, it is not fully fixed, but when an impact is added, it may drop out simply.

[0041] Although the thickness of the ink in the case of printing is based also on the class and the printing approach of ink, it is desirable to set it as the range of 10~100 micrometers. If thickness becomes not much thin, allergen reduction-ized effectiveness may not fully be demonstrated, and when it becomes reverse not much thick, trouble may happen to the touch, or it may drop out with ink by the impact. Moreover, although printing may be performed only to one side of a nonwoven fabric, the still higher allergen reduction effectiveness can be demonstrated by giving both sides.

[0042] Although an example is given to below and this invention is further explained to a detail, this invention is not limited only to these examples.

[0043] (Examples 1~3) The ethanol solution whose loadings of an aromatic series hydroxy

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2006/09/07

JP.2003-313778.A [DETAILED DESCRIPTION]

7/7 ページ

compound are 50 % of the weight was prepared, using ethyl alcohol (Wako Pure Chem make: special grade chemical) as a solvent, using the Poly 4-vinyl phenol (Aldrich make) of Mw8000, the Poly 4-vinyl phenol (Aldrich make) of Mw20000, or the Poly L-thyrosin (ICN biotechnology medical company make) of Mw 15000~35000 as an allergen reduction-ized component, this — solvent mold ink (made in Jujo Chemical "NPS705 Green") — 1:1 — comparatively — coming out — dissolving — allergen reduction — the ink containing a degassed part was prepared. This ink was applied so that it might become uniform thickness through the screen of 210 meshes at one side of the nonwoven fabric made from polypropylene (the "SUTORA tech RW2070" by the Idemitsu petrochemical company). Nonwoven fabric 1m² About 20g ink was applied to area, and the paint film of about 20 micrometers of thickness (before desiccation) was formed, this paint film — 1 evening room temperature — leaving it — drying — allergen reduction — a degassed part was fixed and the allergen reduction-ized nonwoven fabric was obtained. In addition, the thickness after desiccation was about 8 micrometers.

[0044] (Example 1 of a comparison) Except having not blended the above-mentioned allergen reduction-ized component at all, it printed like the example 1 and the allergen nonwoven fabric sample was created. In addition, the thickness after desiccation was about 8 micrometers.

[0045] The allergen reduction-ized nonwoven fabric obtained in the [evaluation of allergen reduction-ized effectiveness] examples 1~3 and the nonwoven fabric of the example 1 of a companion were cut, and the nonwoven fabric sample (33x30cm) was produced. To this nonwoven fabric sample, 1ml of adjustment allergen which made the mixed liquor of the ethyl alcohol 50 weight section and the purified water 50 weight section distribute the dust dust (allergen 2 mg/g) 5 weight section was scattered, and the sample for evaluation was obtained to it.

[0046] It measured allergenic for the sample for the [evaluation approach] above-mentioned evaluation after 8-hour neglect using the allergen measurement kit ("a tick scan" by the Asahi Breweries chemical company) at the room temperature. The judgment was performed according to the directions for use of a "tick scan", and the result was shown in Table 1. The criterion of a tick scan is as follows.

- 1 - There is no contamination of tick allergen. (T= 0)
- 2 - It is polluted a little by tick allergen (T<C).
- 3 - It is polluted by tick allergen (T=C)
- 4 - It is polluted very much. (T>C)

Here, T shows a test line and C shows a control line.

[0047]

[Table 1]

アレルゲン-感度区分	Mw	アレルゲン-EMW2025A
実験1 ポリ4-ビニルフェノール	8000	1
実験2 ポリ-L-チロシン	20000	1
実験3 ポリ-L-チロシン	15000~35000	1
比較1 ポリ4-ビニルフェノール	-	4

[0048]

[Effect of the invention] the allergen reduction-ized nonwoven fabric of this invention — allergen reduction — since a degassed part is being fixed with ink on the surface of the nonwoven fabric, the product manufactured using this nonwoven fabric and this nonwoven fabric discloses the outstanding allergen reduction-ized effectiveness, without performing allergen reduction-ized processing anew.

[Translation done]